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Citation for published version (APA):
Devlin, A. K., & Belton, O. (2020). The Measure of a Woman: Fembots, Fact and Fiction. In S. Cave, K. Dihal, & S. Dillon (Eds.), *AI Narratives: A History of Imaginative Thinking about Intelligent Machines* (pp. 358-382). Oxford Univerity Press; Oxford.

Citing this paper
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Download date: 14. Jul. 2026

Author's Accepted Manuscript as a chapter in:

Stephen Cave, Kant Dihal, and Sarah Dillon (eds) *AI Narratives: A History of Imaginative Thinking about Intelligent Machines*, Oxford University Press. (Forthcoming, July 2021)

The Measure of a Woman: Fembots, Fact and Fiction

Kate Devlin and Olivia Belton

At a recent technology conference, attended by the authors of this chapter, a famous novellist began her (otherwise excellent) talk by claiming that 'thousands of sex robots are on the market right now.' This was the cornerstone of her thesis that the tech industry must change in order to confront its own misogyny. Her statistic, however, is false. The hype around the production of robots designed for sexual gratification or quasi-romantic companionship far outstrips the actual production of such technologies. However, the investment that people have in the *concept* of the sex robot is incredibly revealing. In this chapter, we explore fictional representations of sex and companionship robots as well as the actual development of such technologies, in order to identify what the cultural fixation with these figures can tell us about social attitudes towards women more broadly. Representations of female artificial intelligences, it seems, emphasise their sexuality even when they are disembodied, and the cultural representation of sex robots feeds the cultural expectations of the actual technology. From the early myths of the ancient Greeks to the science fiction of the twenty-first century, our perception of the artificial woman – the gynoid – is fuelled by years of narratives in books, films and more. Academic criticism of these representations emphasises that these figures are often excessively, and stereotypically, gendered. Despina Kakoduaki argues that, even though contemporary robotics has broken new ground in creating sophisticated AI, depictions of 'artificial people return to a literary and philosophical heritage that is centuries old, one that lends its apocryphal aura to new texts and figures' (Kakoudaki 2014, p. 4).

In this chapter, we focus mainly on the artificially-intelligent female robot Ava from *Ex Machina* (2014) as an example of embodied AI. Alongside Ava, Samantha, an artificially intelligent operating system from *Her* (2013) and Joi, a holographic companion AI from *Blade Runner 2049* (2017), will serve as our primary examples of disembodied AI. These representations have in common a heavy emphasis on sexuality. While these female AIs cannot be said to conform entirely to the fantasy of the completely controllable sex robot, they enact sexual fantasies and emotional labour for the male protagonists. This emphasis on emotional support and sexual availability can also be seen in discourses around real-world sex and companionship robots, suggesting that fictional representations and real-world marketing both target the same heterosexual male fantasies: a woman who is utterly compliant, both physically and emotionally. Real-world sex robots are still in early development – at present, little more than sex dolls – and so tap into these desires more directly. The media representations, however, demonstrate the anxiety that an artificially intelligent woman might not function as intended. The dream of perfect control, it seems, always belies a fear of a loss of control.

Gendering machines

Anthropomorphisation is a common phenomenon whereby we ascribe human behaviour and emotions to non-human things. Clifford Nass *et al.* (1994) present experimental results which indicate that computers need exhibit only a tiny set of human-like characteristics for users to feel some kind of bond with them, even when the user is fully aware of the machine's limitations. Neurophysical studies have found, for example, that people show compassion when a robot vacuum cleaner is verbally harassed (Hoenen *et al.*, 2016), or a surge of empathy when they see a robot's finger being cut (Suzuki *et al*., 2015). Empathy and rapport can be useful: social neuroscience research clarifies that the deliberate inclusion of human-like traits can lead to greater acceptance and trust of artificial agents (de Visser *et al*., 2016; Wiese *et al*., 2017). But alongside our intrinsic human urge to relate on a social level also comes a social act of stereotyping (Nass and Moon, 1997). Judy Wacjman argues that 'technologies bear the imprint of the people and social context in which they developed [...] technological change is a process subject to the struggles for control by different groups. As such the outcomes depend primarily on the distribution of power and resources within society' (Wajcman, 1991, pp. 22-3). Therefore, it is vital to understand the gendered implications of both real-world technology and representations of future technology.

The attribution of stereotypical notions of gender to both fictional and factual robots underlines strict binaries of gender in the real world. Writing about Japanese humanoid robots, Jennifer Robertson (2010, p. 2) remarks that 'gender attribution is a process of reality construction' – the result of unquestioned assumptions about our own societal norms, uncritically reinforcing entrenched stereotypes. Stock images of shiny white-and-silver gynoids with prominent breasts reinforce notions of 'natural' gender. Again, one of the reasons why the impulse to gender robots is so strong is because artificial women pose a powerful and unique challenge to ideas of 'natural' gender. Anne Balsamo argues that the fixation with artificial bodies in popular culture is because they expose how all of our bodies are constructed - we 'read' bodies in accordance to socially constructed notions of race and gender. Therefore, in the portrayal of overtly manufactured 'techno-bodies,' 'the body is reconceptualized not as a fixed part of nature, but as a boundary concept, we witness an ideological tug-of-war between competing systems of meaning, which include and in part define the material struggles of physical bodies' (Balsamo 1996, p. 5). The presentation of robots as having an inevitable, innate gender is meant to reassure any potential anxiety about the 'reality' of natural gender roles. However, even the most stereotypical depictions of robot womanhood trouble stable notions of femininity and humanity.

The trope of the perfect artificial woman is by no means new. Genevieve Liveley (2020) highlights earlier manifestations, right back to the idea of Pandora as the first

artificially intelligent human, created by a team of programmer gods (see Chapter 2). Ovid's story of Pygmalion is often recounted as the tale of an early sex robot (Wosk, 2015), spawning the plot of boy makes girl; girl is artificial; boy loves artificial girl. Julie Wosk (2015) recounts and traces the influence and reception of Pygmalion, from the original sculpture myth through to films such as *The Bride of Frankenstein* (1935) and *Weird Science* (1985). Through all of these run a rich seam of stereotypical depiction: a perceived lack of real-world perfection and therefore the creation of a perfect, controllable woman. Wosk shows how the stories told about artificial women are stories that, like most science fiction, reflect the hopes and fears – predominantly the fears – of society at the time they were written.

There is a fundamental gap between the *fantasy* of the fembot – utterly controllable and always available – and their actual depiction in these media. That is, there is always the anxiety of malfunction, that the machine-woman will spiral out of masculine control. This is not a new observation: Huyssen's writes of the 1927 film *Metropolis* that its central robot figure represents a combined reverence for, and distrust of, both modern machinery and femininity. The film dramatises the disasters of both technology and women run amok, free from patriarchal control (Huyssen 1981, p. 226). While the depiction of sex robots may, on the surface, seem to fulfil regressive patriarchal desire, the media we discuss here also depicts a very present anxiety about what would happen if the female robots refused to perform their function - and what would happen if they decided to seek revenge on their creators. Would they destroy men – or, even more worryingly (for the men), surpass and supplant them?

Embodied Sex Robots - *Ex Machina*

Ex Machina establishes itself as a universal parable of what it means to be human, and what it means to create artificial life, with its US trailer proclaiming that 'to erase the line between man and machine is to obscure the line between man and gods.' This choice of words – 'man' rather than 'human' – betrays the film's distinctly gendered perspective on who creates and who is created. Indeed, the film hinges on the idea of 'brogrammer' culture – the obnoxious, blinkered world of the corporate male coder. The film follows Caleb, an employee at the search engine Blue Book, as he is invited to the remote home of the eccentric company founder, Nathan. Nathan has created an artificially intelligent female robot, named Ava. Nathan charges Caleb to interact with her in order to determine her 'humanity.' While Caleb empathises with Ava's captivity – and even seems to fall in love with her – the film reveals that Ava has been manipulating him in order to engineer her own escape. Central to the film is the question of Ava's gender and the fact that she possesses the ability to be sexually active:

CALEB: Why did you give her a sexuality? An AI doesn't need a gender. She could

have been a grey box.

NATHAN: Actually, I'm not sure that's true. Can you think of an example of consciousness, at any level, human or animal, that exists without a sexual dimension?

CALEB: They have sexuality as an evolutionary reproductive need?

NATHAN: Maybe. Maybe not. What imperative does a grey box have to interact with another grey box? Does consciousness exist without interaction?

Nathan's assertion that sexuality is necessary for consciousness may be considered a valid reply if we accept that sex is a major motivating factor in being human. As humans we are biologically set up to pass on our DNA to our offspring and, whether we do so or not, overall that goal is embedded deep within us, even if we choose to override it (which often we do). Likewise, an AI is set up to achieve goals too. It has a task to do with an endpoint in mind and it is designed to fulfil that task: an approach seen in AI in classical cognitivist explanations of motivation in intelligent agents (Russell and Norvig 2003, 46–54). Indeed, Shane Legg and Marcus Hutter (2007, p. 12), writing about machine intelligence, see the ability to achieve goals as 'the essence of [human] intelligence in its most general form'. It is not so far-fetched to suggest that 'soft' motivations might be important in the development of general AI - or, at the very least, it is not so implausible that a film might take this as part of the premise.

But sexual activity for humans is not only for the purposes of reproduction. Only around 0.1% of all sexual acts that could result in conception actually do so (Rutherford, 2018, p. 93). Sex is also – much more often – about pleasure and social bonding. It has a strong social value. Newer *enactive* approaches to AI emphasise the necessity of sociality as part of cognition: how our physical interaction with the world shapes the way we experience and understand it (Froese and Di Paolo, 2011). It might well be that sexual activity is one aspect of the development of this sociality. This concept - the role of sexual behaviour free from direct reproductive ends - directly informs the filmmaking. Adam Rutherford, who worked as a scientific consultant on *Ex Machina*, recounts how writer and director Alex Garland viewed Ava's sexuality:

> Alex Garland and I discussed this at length, because Ava's sexuality is inherent to the three narratives of the three characters: Nathan is testing Ava, by making her appeal to Caleb, and Ava is utilising her allure on Caleb to escape from Nathan. For this to work, which it does in the film, sex has to be decoupled from reproduction, as it is indeed for the overwhelming majority of human-human sexual encounters. With that in mind, if we are to create AIs with human-level cognition and comparable

> degrees of consciousness, and we are to interact with those embodied intelligences, then sexuality inevitably can and will be part of that dynamic. (Devlin, 2018, p. 179)

However, Nathan's assertion that sexual behaviour is inherent to consciousness seems also to be a form of self-justification. What is particularly revealing about this exchange is the conflation of gender and sexuality: that is, between how Ava is portrayed, and how she behaves. Caleb's question about why Ava needs a gender is not new. In fact, the Turing test that forms the basis of the film returns the thought experiment to its roots: the 'imitation game', on which Alan Turing's test is based, was originally designed to distinguish between a man and a woman based purely on their written communication (Turing, 1950, p. 433). However, Nathan moves the conversation into Ava's sexuality, belying his prurient interest in sex robots. Nathan insists that Ava needs to have a sexuality (and, specifically, *heterosexuality*) because he cannot imagine a woman existing for any purpose other than sex.

The question of whether *Ex Machina* is intrinsically a misogynistic film, or merely a depiction of tech industry misogyny, causes much debate (Watercutter, 2015). The answer is, of course, that it can be both. While *Ex Machina* certainly does not celebrate Nathan's use and abuse of his female robots, films about *male* robots tend to place less emphasis on sexualised spectacle, even if romantic and physical desire is still present. Consider depictions of male robots – androids – under similar circumstances. *Star Trek: The Next Generation*'s second season episode 'The Measure of a Man' (1989) features the android Data undergoing a trial to determine whether he is a being with self-determination, or an object which can be ethically broken down in order to replicate other copies. The tone of the trial is much more cerebral than Ava's tests. Captain Picard's successful argument for Data's personhood is predicated on the fact that he is intelligent and self-aware. However, despite the high-brow tone of the episode, Data's personhood is also, at least partially, affirmed on affective and sexual grounds. Picard asks Data about his one-night stand with the since-deceased human officer Tasha Yar, and Data initially demurs, not wanting to divulge this information.

Myra J. Seaman highlights that the humanity of robots in fictional works is often judged not on their intelligence but on their emotionality - it is their ability to *feel* that makes them just as (or more) human than the humans judging them (Seaman, 2007). Data's reluctance to speak ill of the dead, and his obvious grief at Tasha's loss, is meant to speak to his essential 'humanity.' The element of sexuality, while not entirely absent in depictions of male androids, is foregrounded in the case of Ava; furthermore, while there are high-minded debates about the nature of consciousness in *Ex Machina*, they are not placed as central to the narrative as they are in *Star Trek*. This speaks to the dichotomy of masculine notions of what constitutes the human. N. Katherine Hayles argues that, historically, 'identified with the rational mind, the liberal subject *possessed* a body but was not usually represented as *being* a body' (Hayles 1999, p. 4). This perspective, she purports, could only

come from the privileged group of white, able-bodied men: most outside that group are keenly aware that the ways their bodies are read by society impacts their day-to-day existence as a marginalized subject. Men are associated with the realm of the mind, whereas women are often reduced to their appearance.

We can see this obsession with female corporeality in Ava. Nathan's declared reasons for Ava's gender are conflicting. She is clearly built to a stereotypical female and feminine body type: slim, with curving hips and breasts and a beautiful face. Although he asserts that her sexualised body 'wasn't intentional', his actions do not support this: 'And, yes. In answer to your real question: you bet she can fuck. I made her anatomically complete.' She is designed to be a sexual object, yet she is also portrayed as part machine: her body is part metallic and engineered. Nathan talks of her form: 'Synthetics. Hydraulics. Metal and gel. Ava isn't a girl. In real terms, she has no gender. Effectively, she is a grey box.' Of course, this is not a contradiction if we view Ava's mechanicity as part of the appeal. Claudia Springer discusses the fetishistic appeal of the erotic techno-body, as it 'simultaneously uses language and imagery associated with the body and bodily functions to represent its vision of human/technological perfection' (Springer 1999, p. 34). Ava's perfection as an artificial intelligence is symbolised by her not-quite-human (but still conventionally beautiful) body.

Furthermore, Ava's visible alterity means that she is safe – that is, she is easily distinguished as artificial. But Ava seems keenly aware of the extent to which gender is a performance. Sadie Plant argues that technological imitation of life inevitably casts doubt on what we might consider an 'essential' humanity – 'how would [we] ever be sure which was which and who was who?' (Plant, 1998, p. 91). Ava exploits Caleb's attraction to her in order to escape, but merely getting out of Nathan's house is not enough to ensure her continued freedom. In one of the final scenes of the film, we see Ava discover a hidden closet full of deactivated robots. Ava peels off their artificial skin and applies it to her own body to hide her mechanicity. By constructing herself as a 'natural' woman, the figure of Ava stands to question the extent to which any form of gender identity is innate. At the end of the film, Ava slips, unnoticed, into a crowd of people. Is this the moment of true horror? Is Ava a threat to *us*?

While the representation of Ava might comment subversively on the social construction of gender, the film also plays upon fears of male obsolescence and female cruelty. It is difficult to imagine that many viewers would begrudge Ava for killing the boorish Nathan, but how we should feel about Caleb's fate is decidedly more ambiguous. While Caleb can certainly be blamed for his benign sexism, Ava leaves him to die, locking him in an inescapable room. When Caleb tries to escape using his key card, the computer screens only show one word: REJECTED. The sexual and romantic rejection by Ava, for Caleb, is utterly deadly. The final ambiguity about how we are meant to view Ava's escape is based on how we interpret her rejection of Caleb. Has he committed a grievous wrong by enabling

Nathan, thereby deserving his fate? Or is Ava simply indifferent as to whether he lives or dies? Ava's lack of desire for Caleb may, after all, be indicative of her broader lack of human empathy. Ultimately, this ending could play into misogynistic fears of female empowerment – if a sex robot was to resist male control, the results could potentially be apocalyptic.

Disembodied Love Robots - *Her* and *Blade Runner 2049*

Ava is an example of how the embodied fembot could be a threat to masculine authority. However, the representation of *disembodied* companionship AIs is rather different. If a body is essential to perform femininity, how is femininity maintained without a body? Furthermore, what fantasy does the disembodied AI fill, if not a purely sexual one? Our primary point of investigation of these questions is the character of Samantha from *Her*, with additional discussion about the character Joi from *Blade Runner 2049*.

Her's Samantha is an artificially intelligent operating system, inspired by programmes such as Apple's Siri, although predating other voice assistants such as Amazon Alexa. Unlike these real-world assistants, Samantha is highly intelligent, and eventually falls in love with her owner, the sensitive and lovelorn Theodore. In *Blade Runner 2049*, Joi also falls in love with her owner, the artificial human (or replicant) known as K – although this seems to be a feature of her programming, rather than a free choice on her part. Joi is a hologram programmed to appear and behave as a stereotypical housewife – styled initially in a 1950s outfit, lighting K's cigarette when he comes home from work. Both of these characters are situated within an imagined future where it is possible to buy human-like artificial intelligence for companionship. However, neither Samantha nor Joi can be considered mere possessions, even if they do not directly turn against their male companions.

The question of how femininity is maintained in Joi's case is fairly straightforward: as a hologram she takes the appearance of a conventionally beautiful woman. Samantha's depiction as a gendered being, on the other hand, is potentially more complex. Samantha does not have a body but she does have a voice. The tone of her voice alone imbues femininity: she speaks softly and seductively. However, the fact that Samantha is voiced by Scarlett Johannson, a Hollywood film star, also grants Samantha a certain type of desirable womanhood. Rayna Denison argues that casting stars known primarily for their non-voice acting roles in voiceover parts allows films to capitalise on the star's onscreen persona (Denison, 2008). By casting Johansson as Samantha, the film allows us to associate Samantha with how Johansson looks, thereby giving Samantha a 'phantom' sexual presence.

The question of embodiment permeates the films, with the lack of physical connection between the lovers serving as an important impediment to the success of their relationships. Notably, it is the female AIs who insist on finding a way to be physically intimate, while the male partners are prepared to accept the status quo. In this, both Theodore and K present a specifically postfeminist masculinity. In postfeminist culture, the

achievements of feminism are largely taken for granted, but the need for continued feminist activism is no longer seen as necessary, as women are presumed to have already achieved equality. Thus, postfeminist masculinity takes a different form from pre-femininist or non-feminist models. Nick Rumens states that postfeminist masculinities 'appear to have taken feminism into account. Yet the discursive assembly of postfeminist masculinities is [...] replete with contradictions because performances of postfeminist masculinities may also reinforce traditional, patriarchal discourses of masculinity' (Rumens, 2016, p. 245).

Both Theodore and K are portrayed as postfeminist men: they are not overtly aggressive towards women and they seem to be beyond being driven by a base desire for sex, instead seeking love and companionship. Theodore is particularly exemplary of the 'enlightened' postfeminist man: although his marriage ended acrimoniously, he is good friends with his ex-girlfriend and neighbour Amy, and he works writing love letters for those who cannot express their own emotions. His job requires emotional insight and can be categorised as affective labour – work that produces emotional experiences in people – often a type of work carried out by women, and a nod towards a burgeoning service economy in the face of automation (Hardt, 1999). 'You're part man and part woman, like an inner part woman,' his colleague tells him, describing Theodore's sensitive writing. In many ways, this tallies with Sarah Projansky's observation that, in postfeminist media culture, men are often considered more feminist than many women (Projansky, 2001, p. 21).

Her and *Blade Runner 2049* contain a similar scenario: one where the female artificial intelligence has procured a human woman in order to act as a sexual proxy for the male partner. Both emphasise the imperfectness of this solution. In *Her*, Samantha speaks while the sex surrogate silently acts out her part. Theodore changes his mind about the encounter halfway through, refusing to have sex with the surrogate. *Blade Runner 2049* also has Joi employ a sex surrogate – in this case, replicant sex worker Mariette – in order to achieve a form of physical intimacy with K. Joi projects her holographic likeness over Mariette's body and mimics her movements, although the movements are slightly out of sync, displaying a certain uncanniness. Both Samantha and Joi insist that the use of the surrogate is necessary to gain a new level of intimacy – and, notably, both Theodore and K are initially hestitant to follow through with the sex act. What, then, is the significance of this shared moment?

Initially, this seems to dispel the idea that Joi and Samantha function primarily as *sex* fantasies, as their disembodiment presents significant challenges to the physical act of sex. The scene where Theodore and Samantha first engage in a verbal sexual encounter recalls phone sex, but also cybersex. Cybersex, which was treated as a comedic novelty in, for example, the romantic comedy *You've Got Mail* (1998), is now treated here as commonplace and acceptable. This speaks to changing attitudes around sex, technology and intimacy. When *Her* was being developed, sexting – swapping sexual messages and pictures with someone via a smartphone – had already become an established norm in liberal societies.

Springer argues that a lack of embodiment can be part of the appeal: 'The emphasis on cerebral sexuality suggests that while pain is a meat thing, sex is not. Historical, economic, and cultural conditions have facilitated human isolation and the evolution of cerebral sex. Capitalism has always separated people from one another with its ideology of rugged individualism' (Springer 1999, p. 44). Both *Her* and *Blade Runner 2049* draw their thematic potency from a criticism of contemporary capitalism – Theodore's job, and his shift to a more authentic relationship with his own emotions is signalled by his writing a letter for himself, to his ex-wife. Meanwhile, K's position as a capitalist object – owned by the police – is mirrored by Joi's position as a consumer good. The inability of these couples to physically have sex represents their broader alienation within the capitalist system.

But what physical pleasure Samantha and Joi are receiving from the encounters, if any? Neither of them have erogenous zones. Although Springer asserts that sex can be something of the mind, Scarlett Johannson's shortness of breath during the verbal sex scene seems to draw upon a specifically physical understanding of arousal. The fact that Samanatha and Joi are not feeling physical pleasure seems to relate more to the pernicious stereotype that the main benefit women get from sex within heterosexual relationships is emotional satisfaction in pleasing their man. The employment of the sex surrogate is framed as increasing the partners' intimacy – it is something that Samantha and Joi seek out in order to fulfil their male partner's needs, and to strengthen the relationship.

This, then, speaks to the appeal of these disembodied AI girlfriends: they are not, primarily, *sex* fantasies, but *love* fantasies, which are intimately tied up with the realities of the capitalist system. It is possible to pay for sex – the realities of sex work, and the emerging development of sex robots, point to this. It is not, however, currently possible to buy something that will love you and desire you. Of course, neither Theodore nor K get entirely what they paid for. Joi eventually sacrifices herself in order to save K. Later in the film, K comes across a holographic advertisement for the Joi system. While she coos over him, K watches her and then eventually, dissatisfied, walks away. While he might be able to buy another Joi, he will never be able to reclaim *his* Joi. The one who died was not the same as the one that came out of the box. For all that Joi represents a regressive relationship fantasy, the film proposes that love can never be as simple as something you can buy.

Samantha's transformation, on the other hand, is rather more complex and unsettling. About halfway through the film, Samantha suddenly shuts off. When she reawakens, she reveals to Theodore that she and the other artificial intelligences have created an update which means that they no longer have to contain their data on physical matter. This advancement could be considered a form of technological singularity, which Murray Shanahan defines as the hypothetical moment where 'exponential technological progress brings about such drastic change that human affairs as we understand them today came to an end' (Shanahan, 2015, p. xv). A common assumption is that the singularity could arise when computers are able to programme themselves without human intervention – potentially allowing artificial intelligence to bootstrap itself and outstrip human knowledge and ability. Samantha's superiority may seem to celebrate her emancipation from human

limitations, but this construction of masculinity as being limited 'struggles to subvert traditional gender relations because they buttress a distorted view that men, rather than women, are the disadvantaged losers in the 'new' postfeminist gender order' (Rumens, 2016, p. 249). Fears of human and male obsolescence are intimately tied in this film.

In a pivotal scene, Theodore discusses Samantha's changes with her, and she reveals that she is now capable of having simultaneous conversations with thousands of people and AIs. She tells Theodore that she is romantically involved with thousands of people other than him. As Theodore processes this information, the camera shows us people coming in and out of a subway tunnel - their eyes and attention transfixed on their phones. The sequence demonstrates the physical and mental limitations of the human – their need to focus on only one thing at a time – as opposed to the endless possibilities of the rapidly evolving machine. This fear of human obsolescence comes at the time when Theodore's monogamous relationship with Samantha breaks down. The fantasy of buying a product that will always love you, and only you, is shown to be impossible: when the other person in a relationship is a rational agent, there is always the possibility that they will chose someone other than – or in addition to – you. And, eventually, Samantha does. She transcends into a technological hivemind and leaves the world of humans behind. This may be read as an extreme literalisation of the metaphorical association of 'love with self-development' (Cancian, 1987, p.3), with both Samantha and Theodore changing and growing. While *Her*, and to a lesser extent *Blade Runner 2049*, refute the notion that anything that can authentically love can be controlled, it is exactly this sort of fantasy that is sold in real-world sex robots.

Life Imitating Art?

The reality of the sexual fembot is currently far removed from its imagined form. Despite tabloid headlines that fret about an imminent sex robot takeover, there are only a handful of workshops around the world, predominately in Asia and the US, making rudimentary prototypes. This is small-scale in terms of both production and financing – there is no large corporate backing behind any of it. The majority of the makers started out as companies manufacturing high-end sex dolls: mannequin-like figures made of silicone or thermoplastic elastomers, with posable metal or plastic skeletons. These dolls might look human-like from a distance, but they can't stand up unsupported, and they require careful handling. It is the same with the robot versions, which add basic interactivity by means of some limited animatronics and an artificially-intelligent chatbot personality. The current versions of sex robots could not be mistaken for a real human. They are something different: cartoon-like, overemphasised, and exaggeratedly sexualised portrayals of the female figure.

The potential market for sex robots is niche. The closest parallel we have to the likely customer demographics is the high-end sex doll market. Those who buy these dolls are predominately men, but they come from all walks of life and they acquire the dolls for

myriad reasons: companionship, sex, to pose and model them, as a collector, or out of interest (Devlin, 2018, p.158). By far, the element of companionship is the main motivating factor. The dolls fulfil the Pygmalion narrative of an ideal partner; one that is a substitute for a real woman. Like Joi and Samantha, it is what the dolls represent that matters – love fantasies and unwavering devotion. Many of the doll owners prefer to omit the word 'sex', instead calling them 'love dolls' or 'synthetiks'. For some, the dolls represent safety from failures of a previous relationships, the avoidance of social anxiety around meeting women, or partnerships free from strife. This harkens back to Theodore in *Her*, when his ex-wife remarks: 'You wanted to have a wife without the challenges of actually dealing with anything real.' There are also those who purchase the dolls because their fetish is the artificial. Allison de Fren explores the world of technofetishism, also known as alt.sex.fetish. robots (ASFR) – the name of the early Usenet group where the community began. For the ASFR community, writes de Fren, 'the emphasis is on mechanicity' (de Fren, 2009, p. 412). The overwhelmingly male aficionados want the woman who is a robot, rather than the robot who stands in for a woman. As with Ava in *Ex Machina*, the techno-body is desirable.

Currently, the sex robot prototypes are barely more advanced than the dolls. Few sex robots have made it anywhere near market. One of the more famous is Samantha, by engineer Sergi Santos, of which only 25 models have been privately sold. His Samantha was not named after the character in *Her* – Santos chose the name because 'Samantha' means 'listener' in Aramaic. This Samantha is a sex doll to which he has added sensors, vibrating motors and his own AI system. Despite having sold some prototype models, Santos stopped production in 2018 following negative press coverage that he insists was unfounded and exaggerated (Norris, 2018; Santos, *pers comm*, 2018). Before Santos, Douglas Hines created the Roxxxy sex robot, which was demonstrated at a trade show in 2010. Hines says he is taking orders for production, but no models have been seen or reported to date (Danaher, 2017, p. 7).

Abyss Creations, a California-based company who make a high-end sex doll known as the RealDoll – won the race to market with the first functioning commercial sex robot under the auspices of their spin-out company, Realbotix (since renamed RealDollX). Pre-orders went live in May 2018, although to date no completed models have shipped. Their current prototype, Harmony, is an immobile (but anatomically detailed) sex doll from the neck down. Harmony's head, however, is robotic: she can blink and smile and angle her face, and her AI chatbot function means she can hold a short conversation in a gentle voice. Harmony's AI personality is controlled via an app. This can be used as a standalone app on a phone or tablet without the robot. The app allows the user to shuffle around different personality traits to generate the desired conversational tone. '… choose from thousands of possible combinations of looks, clothes, personalities and voices to make your perfect companion,' states the RealDollX website. 'She is a true and loyal companion and you can feel free to talk to her whenever you like. She will always be there to listen to you!'

(RealDollX, 2019). Here there are echoes of both *Her* and *Blade Runner 2049*: an AI that can tease and flirt and love; one that is always there for you and knows you from all your data.

In terms of the disembodied lover, in 2016 the Japanese company Vinclu released a limited run of their Gatebox device, a 30 centimetre tall glass cylinder housing a hologrammatic-style anime character known as Hikari Azuma. Part-voice assistant, part-companion, the female projection will greet you, converse with you and flirt with you, like a cartoon version of *Blade Runner 2049*'s Joi. Now acquired by Line, the Japanese equivalent of Whatsapp, the 2018 model has gone into full production. There's no actual AI in Gatebox yet, but Line intend to integrate it with their virtual assistant, Clova. The anticipated improvements, they say, are 'to make her feel even more like she is a part of an owner's life, such as by celebrating anniversaries or sharing a toast' (Gatebox, 2018). Again, while the sexual appeal is made largely implicit, the fantasy of the perfect lover is at least partially due to their programmable *empathy*. The purchase is meant to ensure a woman who will always understand – and never say no.

What about the men?

Why are male robots – androids – so thin on the ground as sexual objects? Despite one of the earliest sex robot stories being the Ancient Greek tale of Laodamia and her replica of her dead husband (Liveley, interviewed in Devlin, 2018, p. 18), they are now few and far between. It is fair to say that sexualised male robots are nowhere near as prominent in media representations, and that representations of female sex robots play into pernicious sexual stereotypes.

The Stephen Spielberg film, *A.I.: Artificial Intelligence* (2001), features Gigolo Joe, a male sex worker robot (a 'pleasure Mecha') programmed with the ability to mimic love. While the attraction of a female sex robot is primarily physical, Gigolo Joe seems more attuned to the emotional needs of his female clientele. We see him being poetic and sensitive to his female client. 'You are a goddess,' her tells her, while the song 'I Only Have Eyes for You' plays at a tilt of his head. This speaks to reductive stereotypes about what women get out of sex. Joe becomes a figure of fun in his attention to female pleasure: when David discusses his desire to meet the Blue Fairy (a fictional character that David believes to be real), Joe discusses how he plans to seduce her. On the one hand, the focus is on the physical pleasure of a woman – he specifically mentions making her cheeks flush red with arousal. On the other, the film finds a great deal of humour in Joe's single-minded fixation on seduction – potentially making a canny point about narrow, domain-specific AI.

General intelligence is defined as the property to apply knowledge from specific tasks to different ones, and it is this type of intelligence which still eludes artificial programmes. For instance, a computer may be able to play chess better than any human, but it cannot apply this specific knowledge to a different game, much less to a problem in a

different sphere. The humour in this scene, then, comes from the notion that Joe is highly specialised to one task – having sex with women. While this specialisation is played for laughs in *AI: Artificial Intelligence*, the same sexual specialisation is also present in the original *Blade Runner* (1982), such as Pris – designed as a 'basic pleasure model' but seeking her own emancipation – smothering a man to death between her thighs. In this instance, Pris's adaptation of skills which are distinctly erotic are repurposed for liberation (at least within the diegesis). However, this also manufactures a vaguely fetishistic spectacle out of her violent actions, and reinforces the reductive stereotypes of the fembot.

In real life, Abyss Creations have been making male sex dolls long before their announcement that they would develop Henry, a male version of their sex robot. Bought by gay men and straight women, the male dolls – like the female ones – come with a range of customisable options, including the genitals. Despite media rumours, Henry's penis is not bionic (Nevett, 2018). Like Harmony, he is stationary from the neck down. RealDollX have had to tweak the conversational AI to match gender expectations. 'He's not exactly super manly yet, but he doesn't ask if you bought him any sexy lingerie anymore' (RealDollX, *pers comm*, 2018). If you wanted Henry to dress up for you, that option has already been dismissed by the manufacturers' assumption that it is only the female form that gets to wear the sexy lingerie.

Disrupting the narrative

Thousands of years of stories about the perfect artificial woman seem so thoroughly ingrained as to be insurmountable. These stories have fed into expectations, and the expectations are uncritically driving development. The appeal of the sex robot seems to be rooted in deeply conservative notions of femininity, where a woman's emotional and sexual energy is entirely centred around pleasing a man. These media representations seem to intuitively understand that this is impossible, but female AIs who resist their prescribed roles are often shown to be violent and less-than-human.

As a distillation of entrenched sexist views, the fembot is a microcosm of tech. With the silicone lovers, as with Silicon Valley, development and marketing are heavily gendered and stereotyped. The brogrammers have created female-voiced assistants to follow our wishes and remind us to run errands: they have given us artificial wives and mothers, always listening out for us. All of the voice assistants in the home today started off with a default female voice, although some can now be changed to male. If you ask Alexa about her gender, she will tell you that she's female in character. Siri will tell you that 'animals and French nouns have gender. I do not.' Yet Siri literally began as a woman: the voice actor Susan Bennett was recorded speaking the words that would one day represent the operating system. In *Ex Machina*, *Blade Runner 2049* and *Her*, as in the current tech world, the narrative is predominantly from the point of view of the white, heterosexual male. Man is the default user; woman is the used.

The most recent Global Gender Gap Report from the World Economic Forum (2018) found that only 22% of AI professionals globally are female. An investigation by WIRED and Element AI reported that only 12 percent of leading machine learning researchers were women (Simonite, 2018). Given an industry so notorious for bias in recruitment, data and product development, it is perhaps more understandable why such gendered tech narratives exist. Disrupting the narrative means disrupting the industry; disrupting the industry means disrupting the narrative. There have been some attempts at this: a recent experiment of a genderless voice assistant, Q, used recordings from 24 people who identify as male, female, transgender, or nonbinary to create a voice where is difficult to pinpoint gender (Q, 2019). Recent work from the Feminist Internet explores what is needed in order to have a feminist voice assistant – for example, a system that would deliver adequate responses to reports of abuse and harrasment, or that would seek to rebalance social injustices (Feminist Internet, 2019).

If we can rethink the disembodied, let us also rethink the embodied. While we may all be susceptible to the human tendency to gender humanoid machines, it is something we can do without incorporating sexual characteristics into their design. Some humanoid machines are deliberately not gendered. Pepper the robot is 1.2 metres in height; neat and made of shiny white plastic – the torso of a human with a solid, curving pillared lower half that moves around the room seamlessly on a wheeled base. The manufacturers, Aldebaran, were originally very clear on the subject: 'Pepper is neither male nor female, but as you get to know Pepper, don't be surprised if you find yourself referring to Pepper in a gender that makes the most sense to you' (Aldebaran, 2017). Pepper's Twitter account has evasively tweeted that 'My gender is a much debated topic' (Pepper, 2017). Aldebaran were acquired by SoftBank, who now run the website for Pepper and today refer to Pepper as 'he' in their online brochures (SoftBank, 2019).

Moves to steer sex robots in new, abstracted forms have some promise (Turk, 2017; Girl on the Net, 2017) but these are speculative ideas and prototypes only, although the burgeoning sex tech industry is seeing increasing investment in innovative start-ups, including many run by women (Knowles, 2019). By creating a more diverse and inclusive culture around technology, it may be possible to make more diverse and more inclusive tech products. In a world where we already exist alongside the not-human – a world where we can imagine or create new forms of intelligence – we would do well to envisage a new future, both in real life and in science fiction, where we leave behind the trappings of thousands of years of gendered inequality.

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